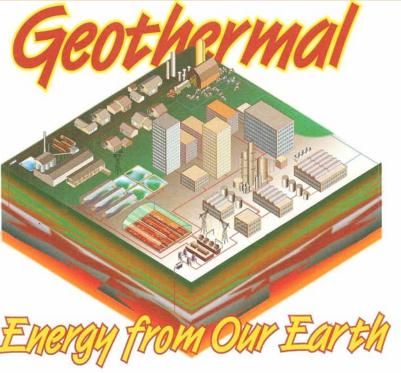


The Hybrid Heat Pump

Renewable Energy Forum & Expo

October 19, 2007



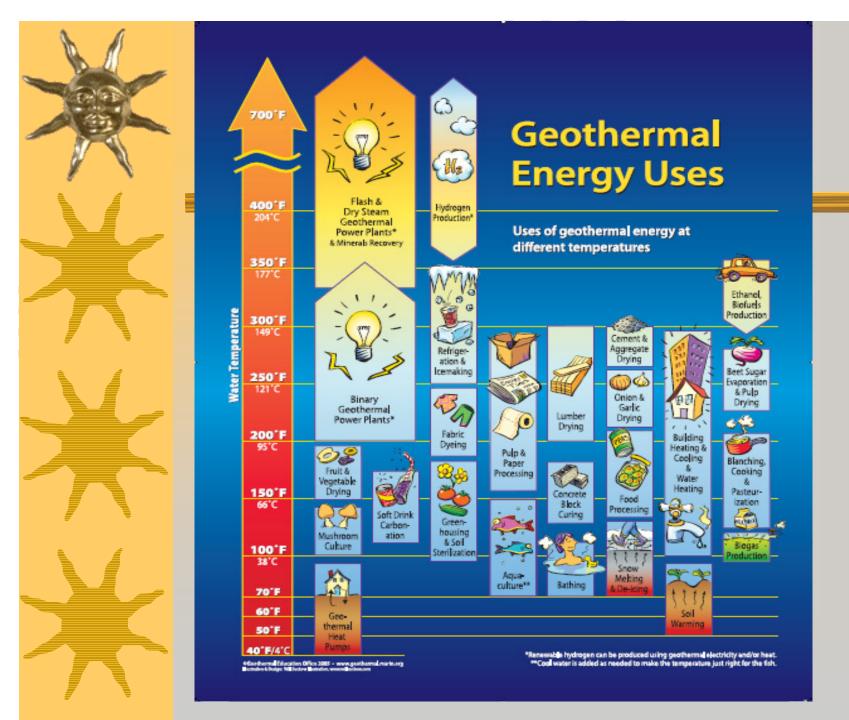
By

Paul Bony

Manager Marketing & Member Services

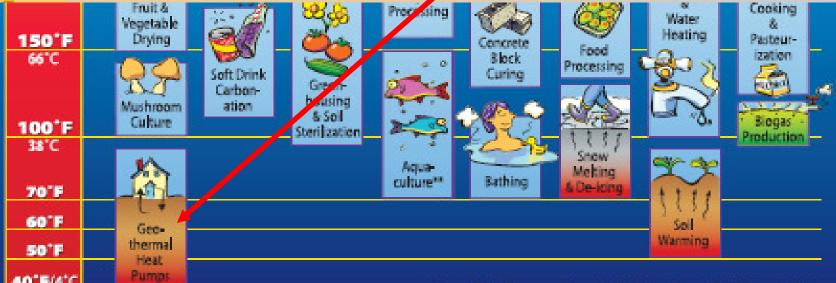
DMEA

pbony@dmea.com





The big consumer market



Other thermal Education Office 2005 - wave gesthermal marks org. Restation to People Will Section Best along, was reductions on "Renewable hydrogen can be produced using geothermal electricity and/or heat.
"Cool water is added as needed to make the temperature just right for the fish.



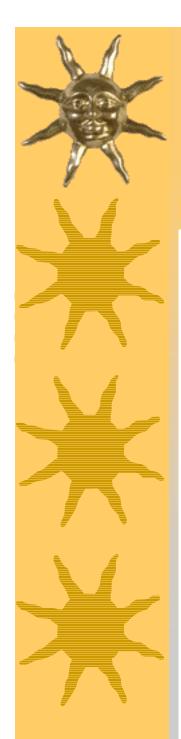
US 2000 Census Data for

105,480,101 Occupied housing units

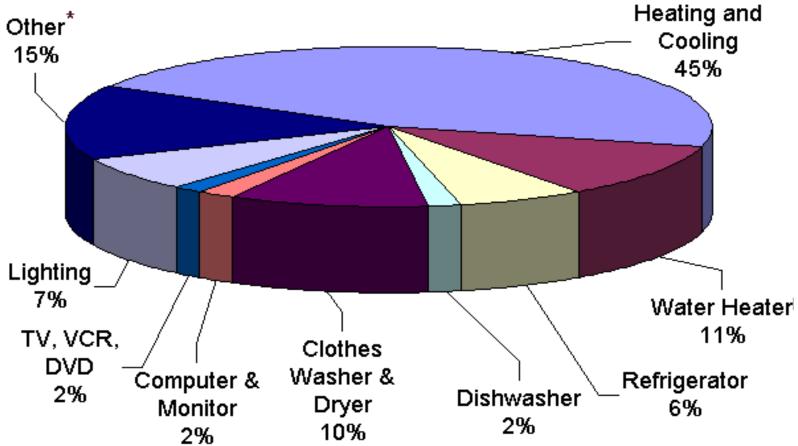
	House H	eating Fu	ıel				
	Bottled		fuel oil				
utility	tank or	Elec-	kerosene	coal or			
gas	LP gas	tricity	etc.	coke	wood	other fuel	no fuel
51.2%	6.5%	30.3%	9.0%	0.1%	1.7%	7.0%	0.4%

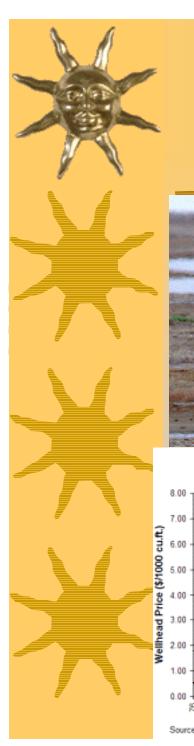
66.7% of U.S. home heating provided by oil & gas

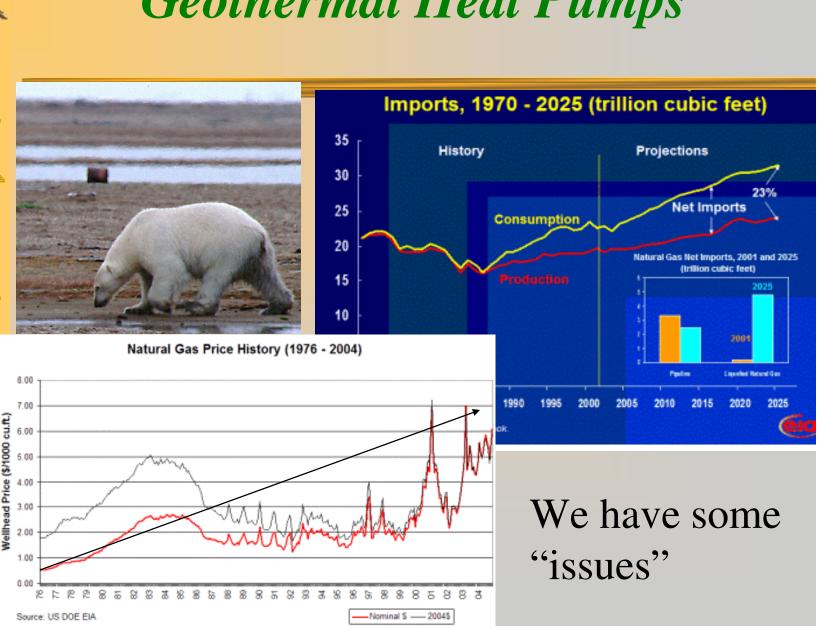
"Household growth is expected to accelerate from about 12.6 million over the past ten years to 14.6 million over the next ten". (The State of the Nation's Housing 2006)











Greatest Natural Gas Reserves by Country, 2006

		Proved receives		
Rank	Country	(trillion ou ft)		
1.	Russis	1,580		
2.	bran	974		
3.	Cata	911		
4.	Saudi Arabia	241		
S.	United Arab Emirates	214		
6.	United States	193		
7.	Nigeria	185		
8.	Algeria	161		
9.	Venezuela	151		
10.	lraq	112		
11.	Indonesia	98		
12.	Norway	94		
12.	Malaysia	75		
14.	Turtmenistan	71		
15.	Uzbekistan	96		
16.	Kazakhstan	\$ 5		
17.	Netherlands	52		
19.	Egypt	99		
19.	Canada	57		
20.	Kunat	56		
Top 2) countries	5,510		
Rest c	fworld	632		

Run by Ex-KGB guy

Acquiring nuclear weapons

We won't let them run our ports

Home of most of the 9/11 Hijackers

U.S. demand already outstrips domestic production.

Not the home of the welcome wagon!

Run by dictator who hates the US

Has some domestic issues to resolve

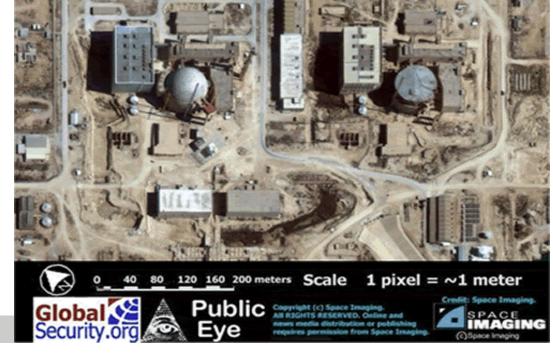
Closer to China than the US

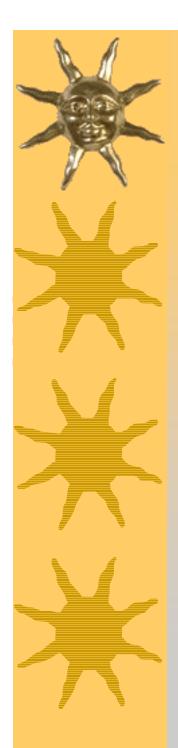
OK, so I like Norway....

How dependent do we want to be on imported heating fuels?????



Business Daily, October 16, 2007. Crude prices set a new record high of \$88 a barrel...edging towards the \$100 mark that analysts, led by investment firm Goldman Sachs, had earlier predicted it would hit before year-end





- *****The new energy environment:
 - Fossil fuel shortages and price shocks
 - Customer focus on renewable energy
 - Government focus on carbon emissions
 - Fertile ground for new electric products and services
 - Electricity is domestically produced increasingly using renewable energy



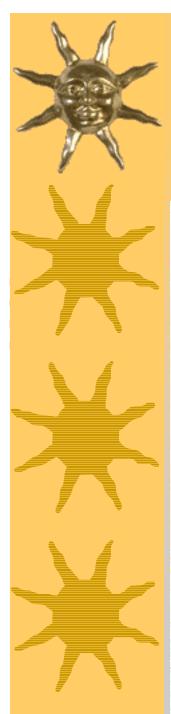
Geothermal Energy (Green Heat)

Mass market direct use geothermal technology

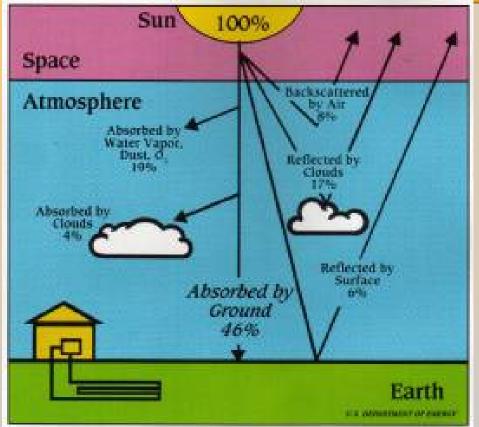


heating & cooling a different world with renewable energies





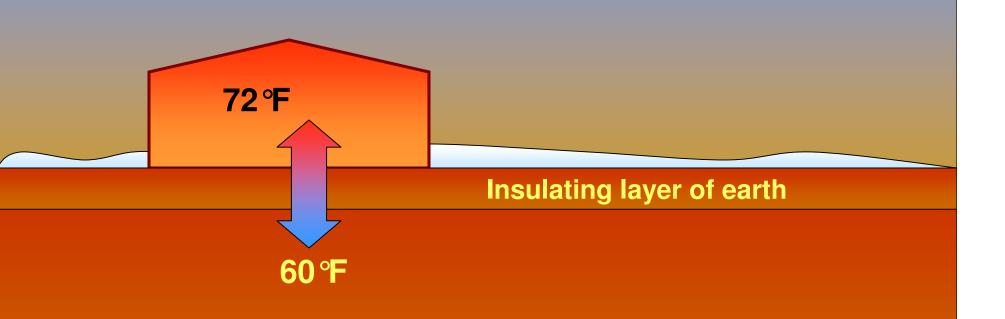
Geothermal Energy (Green Heat)

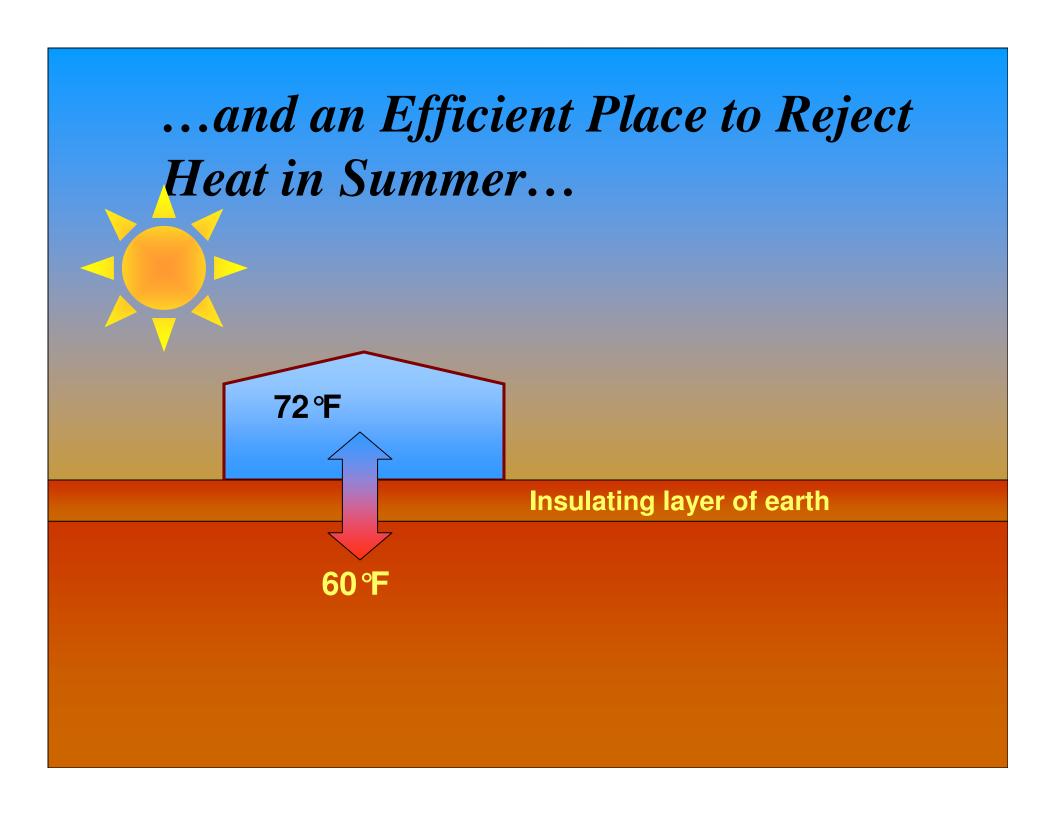


The earth is like a "solar battery," absorbing nearly half of the sun's energy. The ground stays a relatively constant temperature throughout the seasons, providing a warm heat source in the winter and a cool heat sink in the summer.

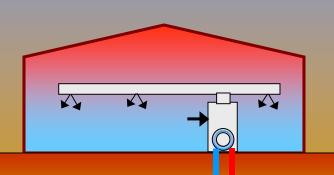
The sun stores almost half of the energy it delivers in ground.

The Earth is the Source of Heat in Winter...





...using Heat Pump Technology



A geothermal heat pump is connected to a sealed water piping loop buried in the earth near the building

Insulating layer of earth

When the warm or cold water exiting the heat pump is pumped through the loop, it is naturally cooled or warmed by the earth surrounding it

60°F



1 kW Electrically generated Energy to power the system

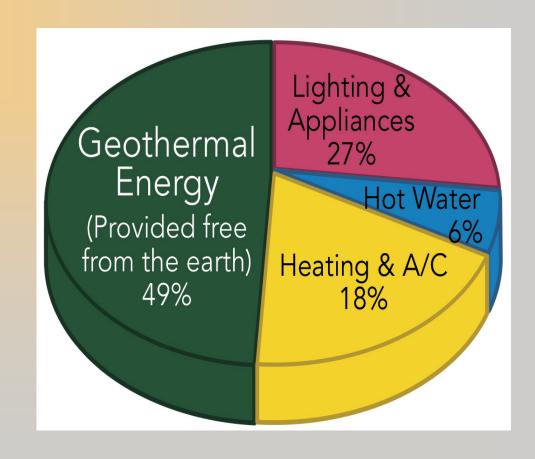
4-6 kW Heat Delivered

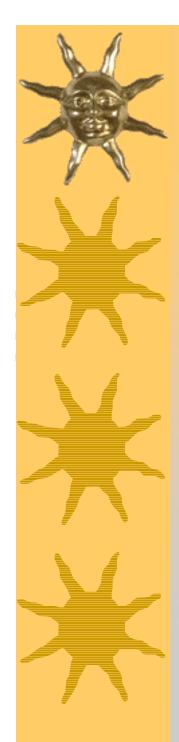
3-5 kW of Geothermal Energy moved from the Earth

400-600% Efficient

Residential Site Energy Geothermal Heat Pump System

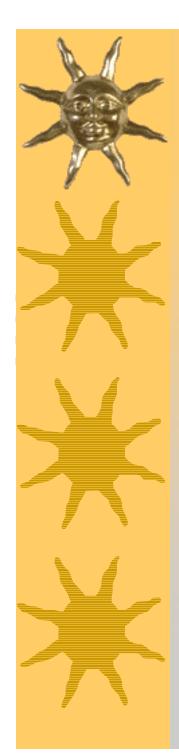
Total site energy consumption is reduced by 50%





Geothermal heat pumps

- * Are a market proven technology
- ***** Cut heating & cooling bills by 50% or more
- * Tap renewable solar energy from the earth
- * Have low power requirements that can be provided by zero carbon renewable sources
- * Provide consumers immediate positive cash flow with conventional financing



70 degree heating and cooling

Electric Resistance

\$2640

(100% radiant/convector zoned system with 13 SEER A/C)

Propane

\$2474

(91% condensing system with 13 SEER A/C)

Natural Gas

\$1021

(91% ignitor condensing system with 13 SEER A/C)

GeoExchange

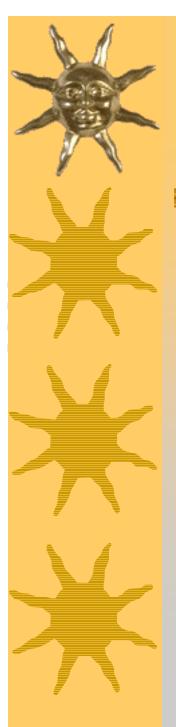
\$724

(350% efficient system with horizontal ground loop)

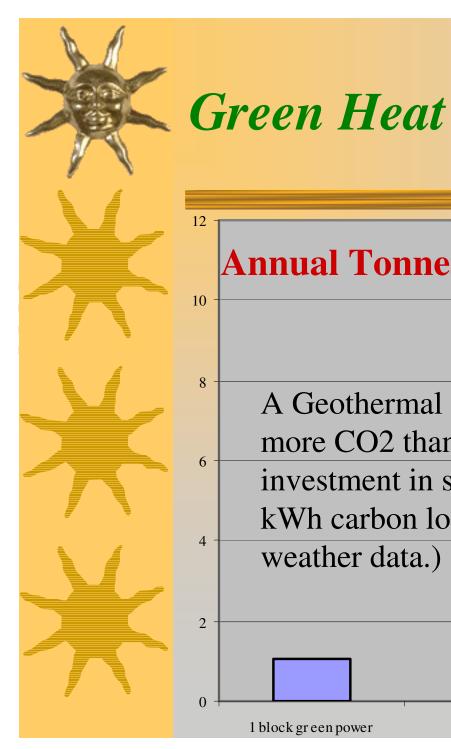
Assumes:

- Typical 2,000 sq foot home (48,000 Btu/hr heating load & 20,000 Btu/hr cooling load)
- · Average temperature design data for Montrose, CO
- Energy costs: Electricity@ \$.093/kWh; Propane @ \$1.96/gallon; Natural Gas @ \$.76/therm

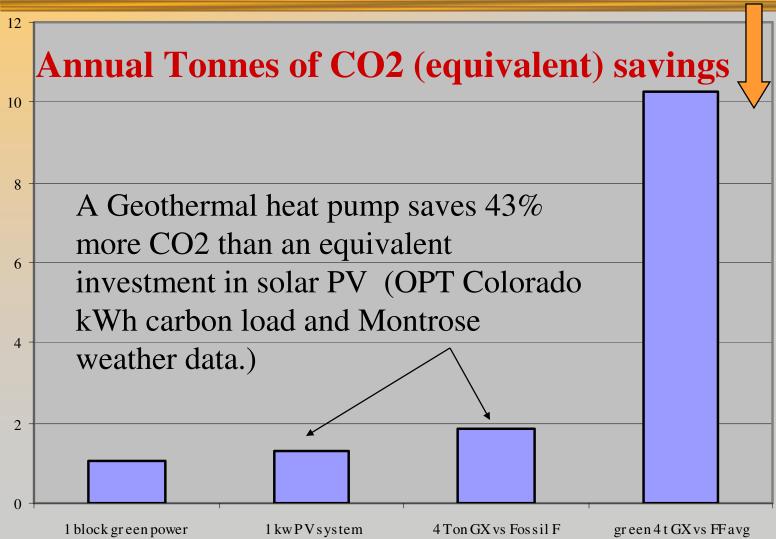
Geothermal heat pumps are cost effective today!



★ Geothermal heat pumps produce the lowest carbon dioxide emissions, including all source effects, of all available spaceconditioning technologies (EPA, 1993)









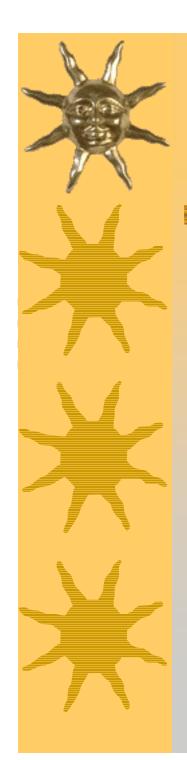


"If GeoExchange systems were installed nationwide, they could save several billion dollars annually in energy costs and substantially reduce pollution"



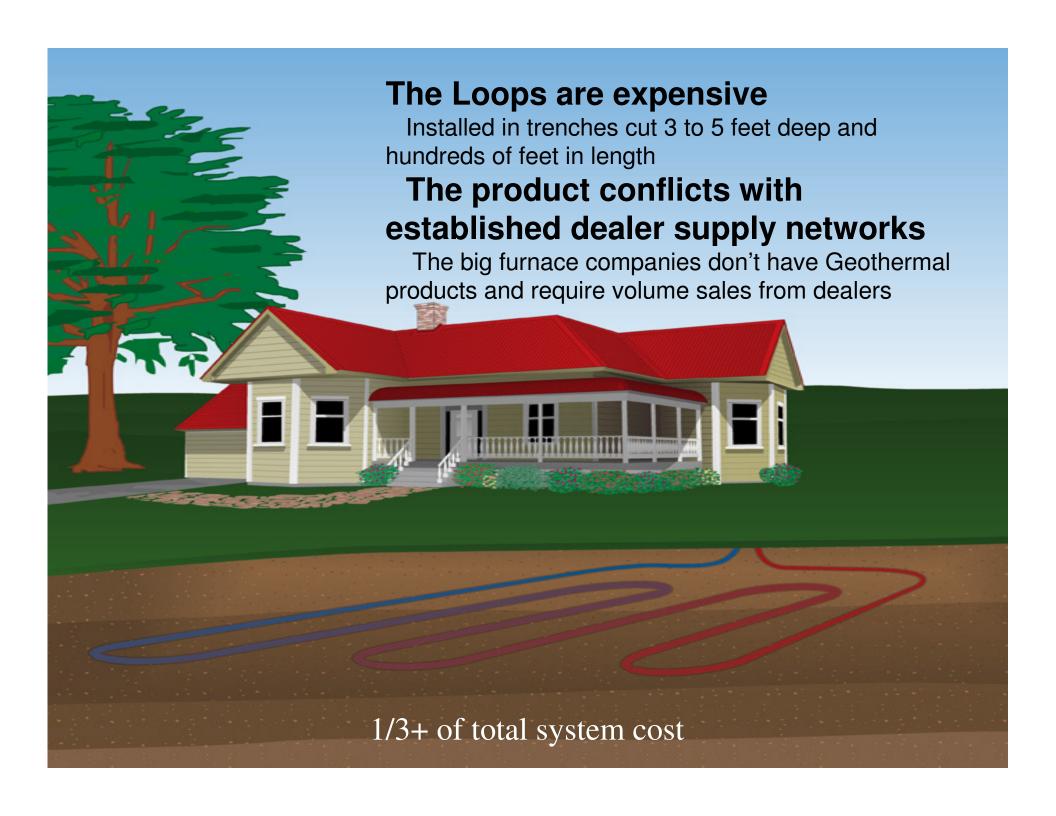
*Since their introduction in the 1980's, *less*than 1 million geothermal heat pumps
have been installed in the united states



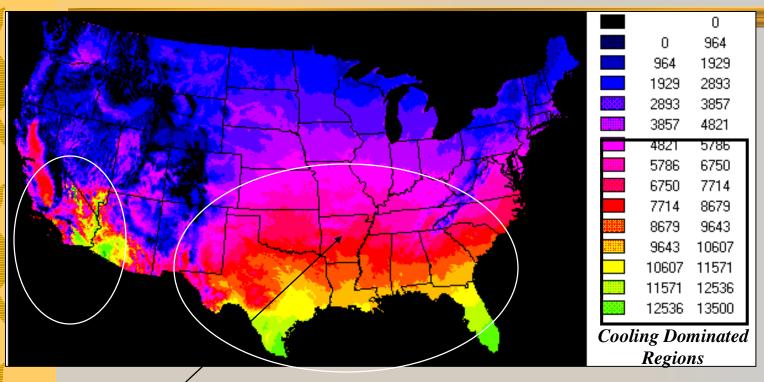


*WHY?





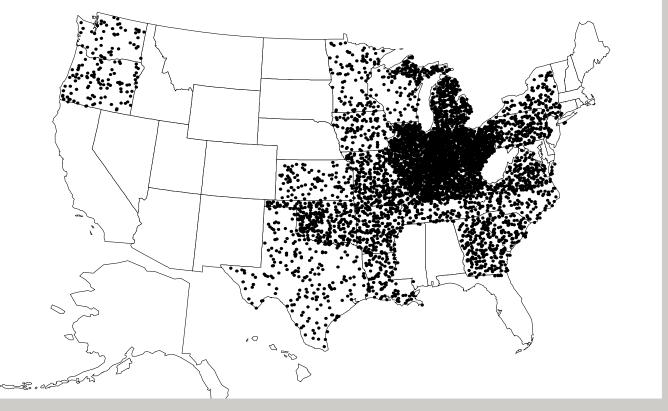




Degree days above 40 degrees F

In cooling dominated areas the loops need to be sized for cooling and are much bigger than needed for heating





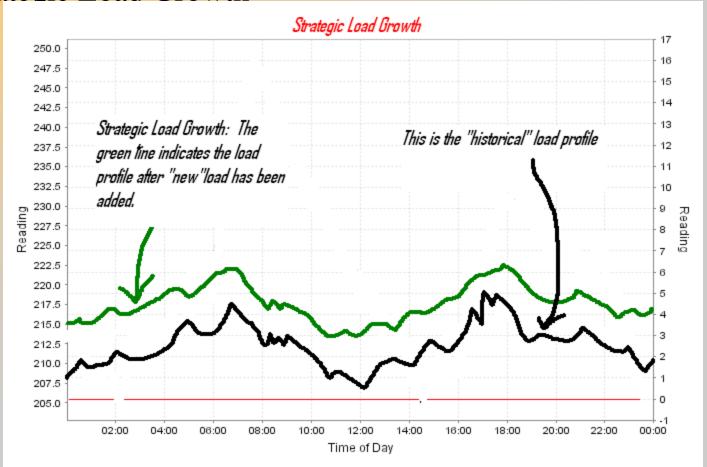
GeoExchange Installations/Dealers are not in every market



- ★Ground source heat pumps (GSHPs) met all of DMEA's DSM screening criteria
 - Proven technology
 - Highest lifecycle return
 - DMEA & our members
 - Great load factor
 - Even better with load control!
 - High environmental benefits
 - Big CO2 savings from renewable energy

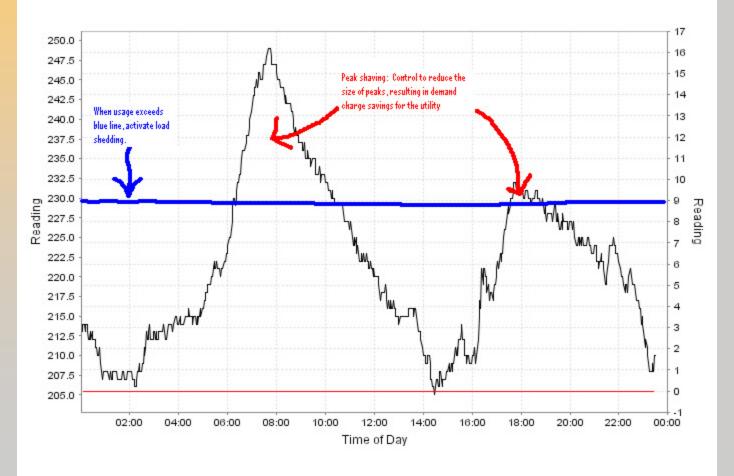


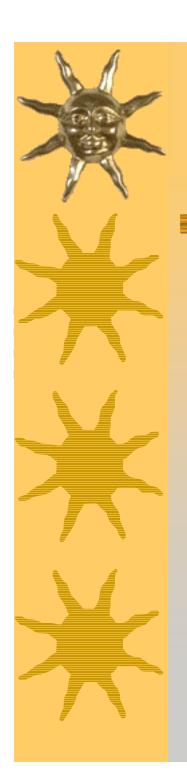
Strategic Load Growth



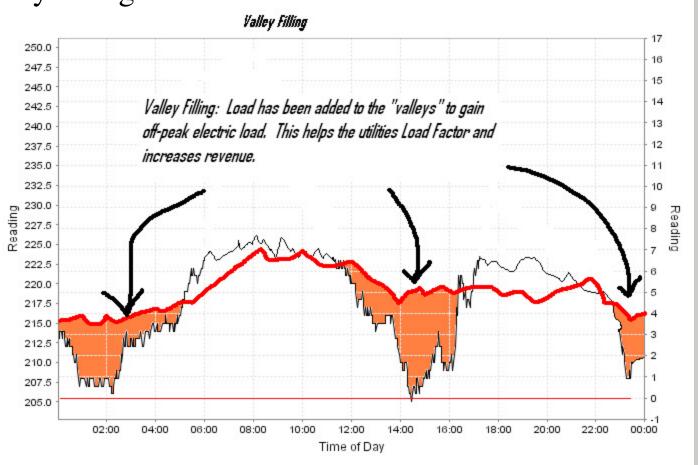


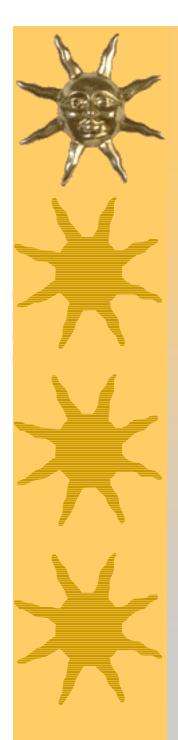
Peak Clipping





Valley filling





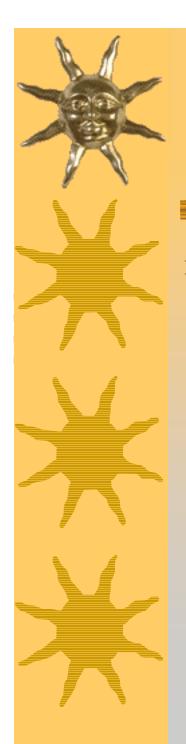
DMEA's perspective

- ***** Installed loop costs \$6,000 (retail)
 - = Premium over high end gas equipment
- ***** Generates \$410.64 in annual margins
 - \$12,319 total revenue over 30 years
 - An IRR of 5.45%
- * DMEA's return on poles & wires
 - 2004 ROI 3.8%
- * We have tested several "financing" tools and are now piloting a "loop tariff"
 - We intend to recover the cost of the loop, earn more than our cost of funds, and accelerate market growth for GSHPs



500+ Geo Members & Adding 100+ Per Year





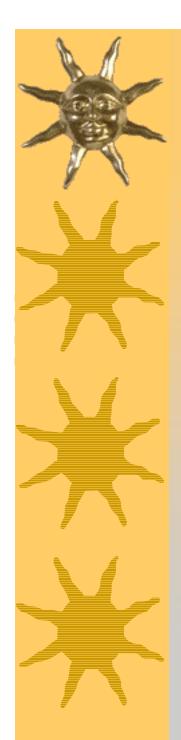
- ***Could** we do better?
 - By reducing installation costs
 - By incorporating load control and peak time pricing



Magic Moment

Younger me



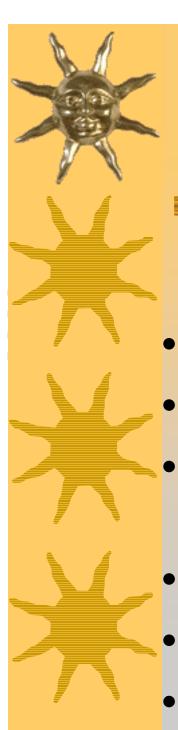


Geo Hybrid Heat Pump





Co Energies, LLC



Geo Hybrid Heat Pump



- Traverse City, Michigan HVAC contractor
- Leading national geothermal dealership
- 1,200+ geothermal heat pump systems installed over 25 years
- DX research since '95
- 4 DX patents
- "Hybrid" heat pump patent developers



Electric co-op full of bright ideas

Fuel cell among energy innovations nearly ready to go

electric power

Demo project to provide part

of fire station's

Fuel cell powers DMEA exhibit at Dennis Weaver's 'Clean Air Festival'



Basin Electric



Delta-Montrose installs nation's first propane fuel cell



Alternative Energy = High Interest (and we have a really

good PR department!)

A Touchstone Energy[™] Cooperative **K**





CUTTING EDGE IN RURAL COLORADO?



inside?



TOTAL A

GDI

Delta-Montrose Electric Association

Conceived and developed
 Marketing/Finance/loop tariff
 Plans

Energy Plan

Comfort • Savings • Security

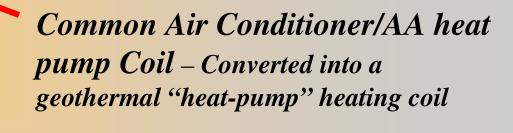
Geofurnace Development Inc.

Invented "Geothermal Conversion Components"



CoEnergies, LLC





Common Air
Conditioner/AA heat pump
Compressor – Converted into
A geothermal "heat-pump"
compressor

Common Furnace & Air Conditioner

Key Components

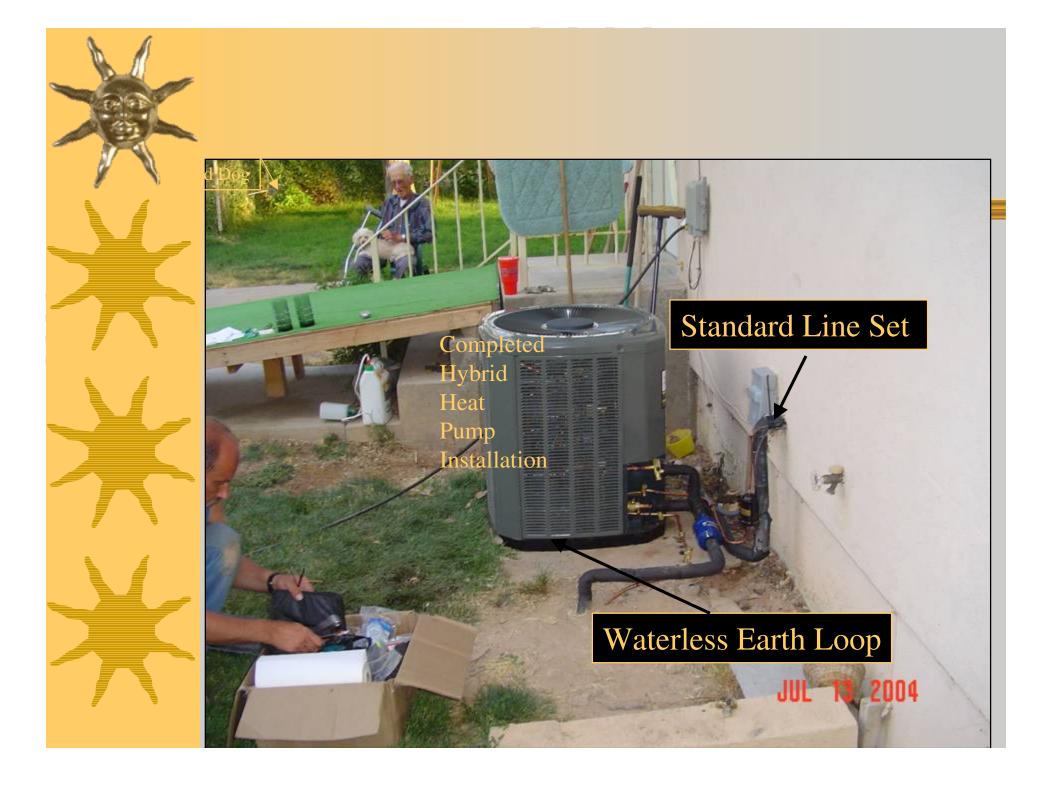
With a smaller loop because outside air is often warm enough to do the job!







Product development history





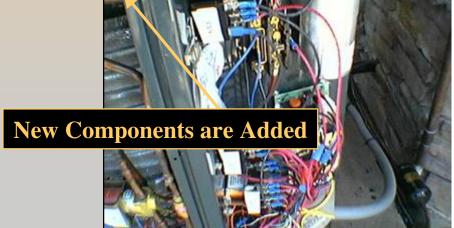














For Smaller Lots...
Vertical "Waterless" Earth Loops
are installed in 4" holes, 75' Deep
(6 holes average)

For Larger Lots...

Horizontal "Waterless"

Earth Loops

are Installed
in 24" Deep Trenches,

75' Long, (6 trenches average)

Polyethylene coated 7/16" copper tubing - brazed in a header access box, or "standard" GX poly loop pipe





Conversion Modifications

Common to all heat pump brands, makes, models...

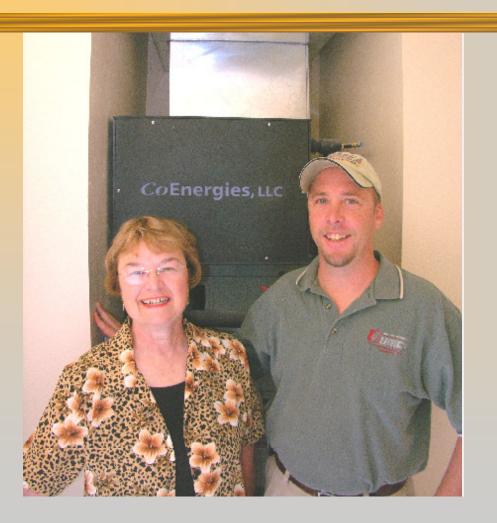




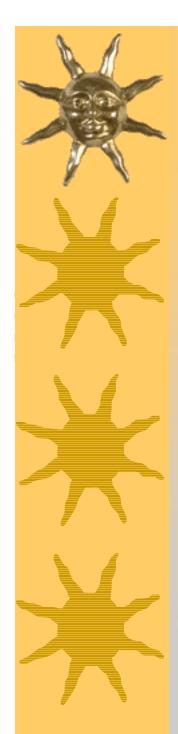
Disassembled



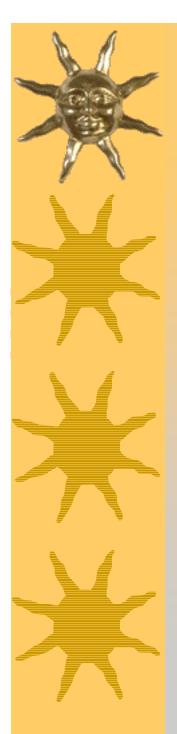




The greatest energy saving system you have never heard about!



- * Reduces market barriers for geo heat pumps
 - Technology is cheaper, faster, easier/quicker to install,
- ***** Exploits existing HVAC technologies/products
 - This is an "after market" product
 - No channel conflict with the "geo hybrid" heat pump
 - Retrofit product for common, mass produced air conditioners
 & air source heat pumps
 - Blends the best of air source and geothermal products

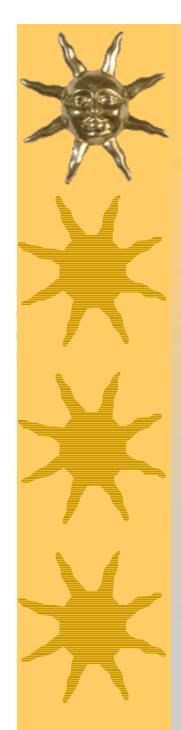


- *Loops are
 - Shorter
 - Shallower
 - Easier
 - Cheaper
 - Less disruptive

Because the Earth Loop is Only Used in limited Heating and Defrost Mode....



- * "Loop it later" option.
- * Geo hybrid" heat pumps can be installed in a day and operated in the heating or cooling mode, without the earth loop.
 - Loop can be added at any time.
 - More "dealer friendly" due to standard components, tools, techniques.
- * Easier installs for the replacement and builder market.



The EarthSaver Line Is:

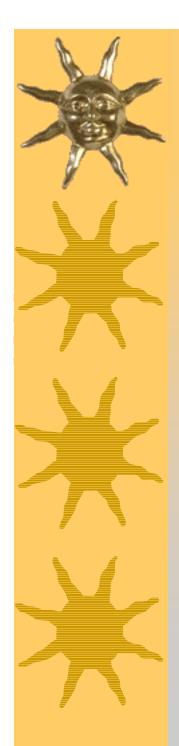
Unique

- it is the first "out of the box" geothermal product line ever
- it is an "out of the box" component solutions
- It is smaller, simpler, cheaper, easier, faster, more reliable, more efficient

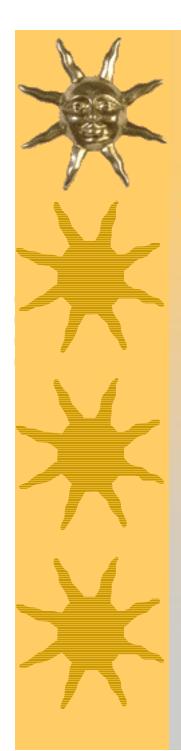
Universal

 it works with any brand, make, model furnace, air conditioner, or heat pump

A new product category!

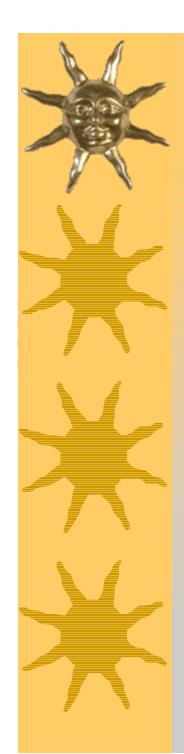


- **★Product Development History**
 - Direct Exchange Conversion 1995 (GeoFurnace)
 - Conversion Module & Geothermal Defrost Products
 - Module prototype 1997 (still in operation)
 - Both Patents Awarded 1999
 - Module Prototypes produced, installed, modified, and performance tested 2000-2007



Partners' Investments to Date \$1,200,000 (+)

- * Patents GeoExchange conversions
- * Co-Z Plan Development & Implementations
- * Product R&D & Testing Ferris State
 University, Cooperative Research Network
- * Market Research Dewar-Sloan Consultants
- * Manufacturing Engineering, Drawings, Jigs, Processes WaterFurnace International



Independent Testing Results

Ferris State University Findings

"Systems consistently performed beyond expectations"

"Confirms inherent efficiencies potentials of the waterless technologies"

"20% to 60% higher efficiencies than traditional water-based GeoExchange systems"



E-UPDATE

January 24, 2007

Technologies Show Promise for Easing Heat-Pump-Driven Peaks:

"Many Southern co-ops are experiencing an unwanted shift to a winter peak. Alabama Electric Cooperative and CRN have been investigating the performance and potential of ... emerging HVAC technologies. A geo hybrid heat pump ... and an electric thermal storage (ETS) system were tested to evaluate their demand-related performance. Preliminary findings show that both technologies lowered electricity consumption during peak hours and produced measurable savings..."



CRN Test Conclusions, continued

- * "In regard to peak reduction, this system performed ideally"
- * "this hybrid heat pump has reduced the owner's contribution to the system peak by at least 3.3 kW and possibly up to 6kW
- * "We were quite impressed with the performance of the hybrid heat pump. It operated efficiently and reliably. As we have mentioned, the improvement over traditional heat pumps is significant, both in low temperature operation and in its defrost operation."



Independent Market Research

Dewar-Sloan

"The Co-Z concept of a utility-leased SynDex system is very compelling to the consumers tested, with over 35% expressing a very high level of interest. Most new products and concepts test at less than 5%."

- "Geothermal dealers expressed a high level of interest, indicating a willing channel partner, able to serve a large market."



Hybrid patent awarded Summer 2007

an United States Patent Ambs et al.

(a) Patent No.: US 7,228,696 B2 (45) Date of Patent: Jun. 12, 2807

(34) HARRID HEAGING AND COOKING SYSTEM (20) Loventon Rev K. Ambs, Toronto City, Mr (1.8)

Thomas G. Kiessel, North Muskegon, VI (18), Dengis J., Weston, Norther J., V. (18); James V. Holstine, Traverse

(75) Assignaci Geofficance Development Luc., Transace City, M1 (US)

(hi) Modes: Subject to any discialment heterminishis parent is estunded or adjusted casks 35 U.S.C. 154(b) by 185 days.

(21) April No. 11/167,423

(22) Filed: Yun, 27, 2005

Print Publication Data

OS 2000A0300 24 A) O.K. 38, 5006

(5.) Int. Cl. 1/25D 23/32 (300631)

(52) U.S. Cl. See a splication five in a applete search his any

References Cited

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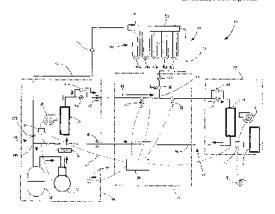
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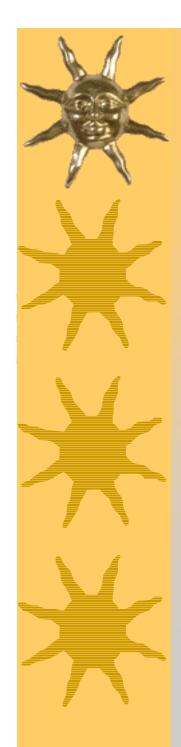
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Princes Acordines-McLaumad M. Al-(74) Arterney Again, or Pieur. Wurner Necessia & Junit

A heat and cooling system having the wholes a look summaring on ordinos sur one subsection, a gas discussed subsection and a composition of selectively appearing the gapter in air to air flessing, distribution of the gapter selecting authorized by givently and poolbering defined modes. The various subdivious may be connected to one one over in parallel. The hearing and conting system may anchold a control, 138 km dr. potunts religionari in he selectively souted through one two of the beat exchangers to provide the various modes of coemtion. It one entited mental the control system may periodally trade-keet enough basing a single reversing valve, a plurelity of check to was a plur-lity of schedule valves and a plurelity of expansion decayes.

25 Claims, 5 Drawing Sheets

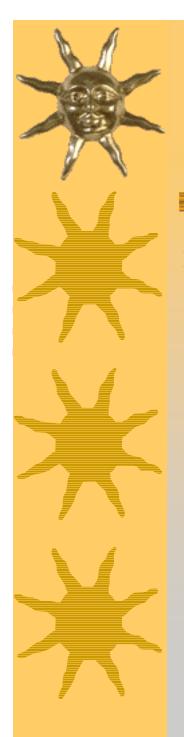




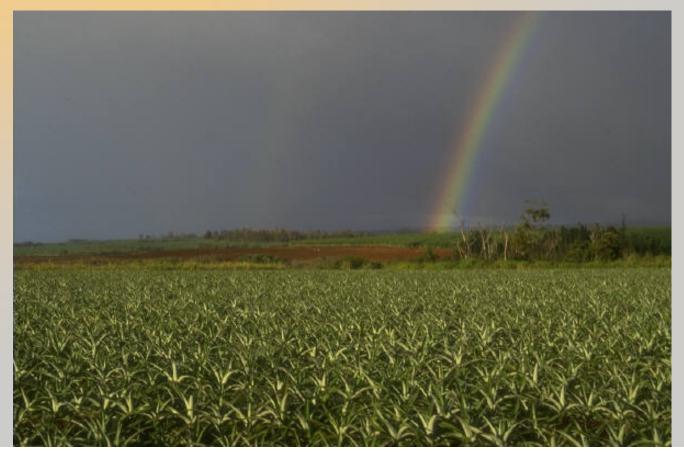
Remaining development needs

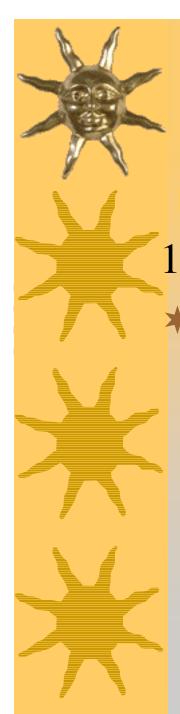
- * Performance
 Documentation
 Funding
 - More MonitoredSystems
- * Commercialization R&D Funding
 - Marketing Plans

- * Commercialization Funding
 - Production/MarketingDistribution/Sales
 - Plans
 - Programs
 - Systems



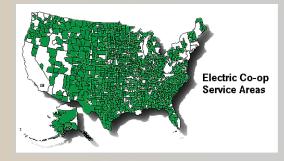
★Green field investment opportunity





1st Target Market & Potential

- *Rural/suburban homeowner, with:
 - Propane furnace
 - Air conditioner
 - Electric cooperative member



3.0 million to 5.0 million units

Annual conversion potential 150,000 to 300,000 units

(DewarSloan)



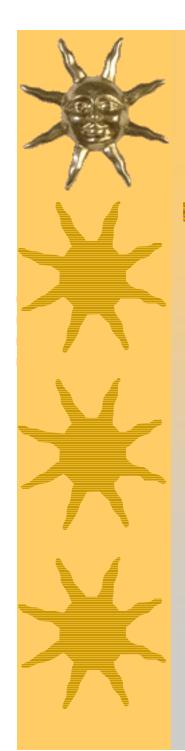
Utility Marketing Opportunities

- *Marketing programs
 - Incentives rates, rebates
 - Financing low interest
 - Co-Z loop tariff
 - Ideal demand response
 - No-peak demand using duel fuel & load control





*Summary



A Well Timed Opportunity

Unique, patent protected, energy saving products and creative marketing/financing programs for

"The New Energy Crisis"















- **★Thanks for your attention**
- *Questions?
- *Contacts
 - Rex Ambs
 - (231) 943-1000
 - rex@geofurnace.com



Cost Today 3ton(Dealer)

* Air Source split

- Equipment \$1,850

* Geothermal split

- Equipment \$2,800
- Northern loop \$2,000600' of trench 4 pipe
- Southern loop \$2,300600' of trench 6 pipe

★ Hybrid split

- GeoReady \$2,050
- Hybrid module \$1,600
- Northern Loop \$2,000600' of trench 4 pipe
- Southern Loop \$1,500200' of trench 6 pipe



CoEnergies Opportunity

- **★Total funding \$7 million**
 - Equity funding \$2.5 million (start-up)
 - Peak debt funding \$4.5 million (third year)
 - Start-up Costs
 - Marketing and field support \$2.2 million
 - 10 regional sales professionals
 - Working capital \$4.4 million
 - Inventory, staff, R&D
 - MIS, Equipment, Furniture, Etc.- \$ 400,000



CoEnergies Opportunity

★Projected SynDex results summar

Business Plan, 1st Target Market)

	Year 1	Year 2	Year 3	Year 4
Unit Sales	1,000	9,000	16,000	16,600
Sales	\$2,467,000	\$21,942,000	\$38,550,000	\$39,554,000
Gross Profit	\$703,000	\$6,246,000	\$11,154,000	\$11,521,000
Net Income	(\$2,266,000)	\$799,000	\$2,326,000	\$1,768,000
EBITDA	(\$2,084,000)	\$1,211,000	\$3,481,000	\$3,457,000



"Open Window"

- * Timing is good, energy awareness is high
- **★ Product is in production** (by WaterFurnace)
- * Dealer infrastructure exists
- * Utilities seeking energy options
- * Consumers getting "price shocks"
- * Rapid growth can be accomplished through an existing dealer network





Exit/Liquidation Strategy

Management buyout

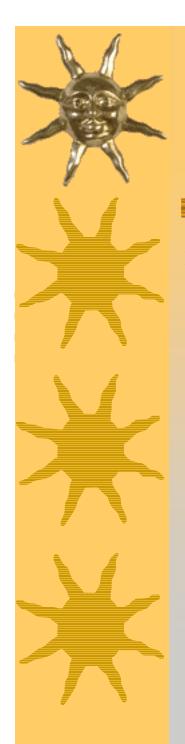
- From cash flow
- Financing
- Acquisition by major manufacturer
- Acquisition by major utility/energy company



Target Valuations

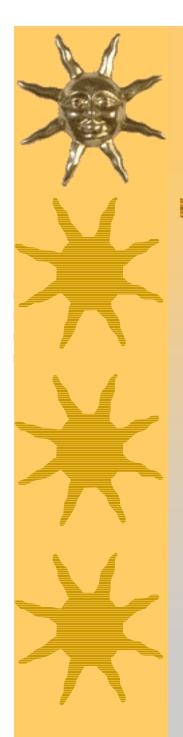
(from business plan projections)

	Year 1	Year 2	Year 3	Year 4
EBITDA	(\$2,084)	\$1,211,000	\$3,481,000	\$3,457,000
3X Multiplier		3,633,000	\$10,443,000	\$10,103,710
7X Multiplier		8,477,000	\$24,367,000	\$24,199,000



Geothermal Green Heat

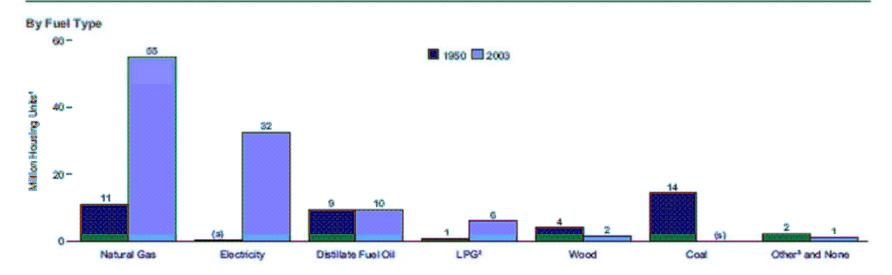
- ***** So can we change the market to green heat?
 - Utility gas (including bottled gas) was used by 11 percent of homes in 1940, although it was dominant in California (67 percent). Its growth was very rapid, rising to over 50 percent by 1970 and leveling off
 - The percent of homes using fuel oil (including kerosene and other liquid fuels) has fluctuated from 1940 to 2000. That rate has increased each decade from 1940 (10 percent) to 1960 (32 percent). From that point, it declined each decade, to its lowest level of 9.0 percent in 2000.

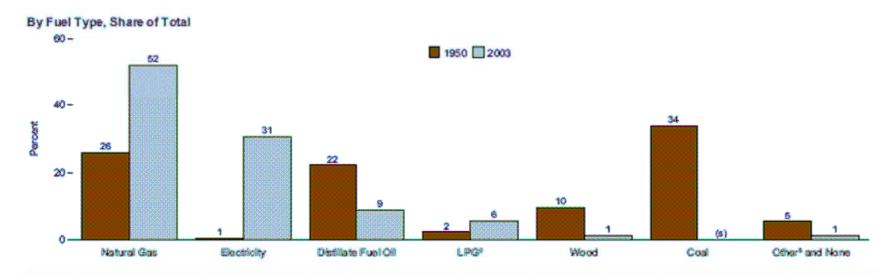


Geothermal Green Heat

- **★So can we change the market to green heat?**
 - In 1940 electricity as a heating fuel was so rare that its use was not counted at all by the census bureau. Even by 1960, electricity was only used by 1.8 percent of the country. After that year, electricity usage began to climb rapidly each decade, reaching over one-quarter of American homes by 1990 and heating 30 percent of homes by 2000.

Figure 2.7 Type of Heating in Occupied Housing Units, 1950 and 2003





¹ Sum of components do not equal total due to independent rounding.

3 Kerosene, solar, and other.

(s)=Less then 0.5. Source: Table 2.7.

^{*}Liquefed petroleum gases.



